

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Thomas M. Tillotson et al.	Docket No. :	IL-10575C
Serial No. :	09/586,426	Art Unit :	3641
Filed :	June 2, 2000	Examiner :	E. Miller
For :	Method for Producing Nanostructured Metal Oxides		

PRELIMINARY AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

Kindly amend the above-identified application, which is a division of Application Serial No. 09/586,426 filed June 2, 2000, as follows:

IN THE CLAIMS:

Claims 1-8 cancelled.

Please add the following claims:

9. A sol-gel process for producing monolithic aerogels or xerogels containing nanostructured metal-oxide materials comprising:

dissolving a metal salt in a solvent at least containing water to produce a solution,

inducing sol formation by one of the group consisting of natural formation, changes in pH; change in ionic strength, and change in temperature,

adding a proton scavenger to induce and control gelation for producing a gel,

providing sufficient time for gel formation, and

drying the gel to produce monolithic metal-oxide aerogels or xerogels.

10. The sol-gel process of Claim 9, wherein drying is carried out by one of supercritical extraction to produce an aerogel or by evaporation to produce an xerogel.

11. The sol-gel process of Claim 9, additionally including washing the thus formed gel prior to drying.

12. The sol-gel process of Claim 9, additionally including aging the thus formed gel prior to drying for increasing strength of the gel and enabling easier drying.

13. The sol-gel process of Claim 9, additionally including the formation of metal-oxide particles from the thus formed monolithic metal-oxide materials.

14. The sol-gel process of Claim 9, additionally including providing the dissolved metal salt from the group of inorganic salts consisting of  $\text{Fe}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Ga}^{3+}$ ,  $\text{In}^{3+}$ ,  $\text{Hf}^{4+}$ ,  $\text{Sn}^{4+}$ ,  $\text{Zr}^{4+}$ ,  $\text{Nb}^{5+}$ ,  $\text{W}^{6+}$ ,  $\text{Pr}^{3+}$ ,  $\text{Er}^{3+}$ ,  $\text{Nd}^{3+}$ ,  $\text{U}^{3+}$ , and  $\text{Y}^{3+}$ .

15. The sol-gel process of Claim 9, wherein the metal-oxide monolith contains materials selected from the group consisting of  $\text{Fe}_x\text{O}_y$ ,  $\text{Cr}_2\text{O}_3$ , and  $\text{Al}_3\text{O}_3$ .

16. The sol-gel process of Claim 9, wherein the metal salt is selected from the group of  $(\text{Fe}(\text{NO}_3)_3)_9\text{H}_2\text{O}$ ,  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ , and  $\text{FeCl}_3$ , and wherein the gel formation is composed of  $\text{Fe}_x\text{O}_y$ .

17. The sol-gel process of Claim 9, wherein the proton scavenger contains oxacyclo-alkane.

18. A method for producing monolithic aerogels or xerogels containing metal-oxides, comprising:

weighing a solution to be used and containing at least a portion of water,

dissolving metal salts in the solution by mixing,

adding a quantity of propylene oxide to the solution,

stirring the solution,  
allowing the solution to gel, and  
drying the gel using supercritical extraction  
to produce an aerogel, or using low temperature evaporation to produce an xerogel.

19. The method of Claim 18, wherein the weighing the solution is carried out using 1.0 gms  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  and 5.0 gms ETOH (200 proof), wherein adding the propylene oxide is carried out using 2.0 gms of propylene oxide.

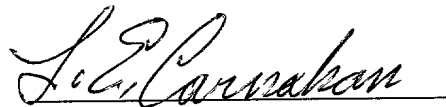
20. The method of Claim 18, additionally including controlling solution gelation time by varying the quantity of propylene oxide added to the solution.

#### Conclusion

Examination of new Claims 9-20 is requested, Claims 1-8 having been cancelled.

Respectfully submitted,

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L.E. Carnahan  
Agent for Applicants  
Registration No. 20,555  
Tel. No. (925) 422-5024